CLAIMS

What is claimed is:

1. A method of manufacturing a dental restoration comprising:

forming powder selected from ceramic, glass-ceramic powder and mixtures thereof into a green body;

sintering the green body to a body of soft-sintered state;

milling the soft-sintered body into a dental material; and

sintering the dental material to final density to form the restoration.

2. The method of claim 1 wherein the milled soft-sintered body retains the milled shape without the use of a mold during sintering to final density.

3. The method of claim 1 wherein the powder comprises a material that may be sintered to a strength of greater than about 250 MPa.

4. The method of claim 1 wherein the powder comprises aluminum oxide, partially stabilized zirconium oxide, mullite, or mixtures thereof.

5. The method of claim 1 wherein the green body is formed by a method selected from pressing, extrusion, slip casting, gel casting and injection molding.

6. The method of claim 5 wherein pressing comprises cold isostatic pressing, hot isostatic pressing or uniaxial pressing.

7. The method of claim 1 wherein the green body comprises powder and one or more binders.

8. The method of claim 7 wherein the powder is of uniform particle size.

9. The method of claim 8 wherein the particle size is in the range between about 1 and about 30 microns.

10. The method of claim 1 wherein the dental material is an orthodontic appliance, bridge, space maintainer, tooth replacement appliance, splint, crown, partial crown, denture, post, tooth, jacket, inlay, onlay, facing, veneer, facet, implant, abutment, cylinder, or connector.

11. The method of claim 1 wherein the green body is substantially homogeneous.

12. The method of claim 1 wherein the dental material shrinks isotropically during sintering.

13. A method of manufacturing a dental restoration comprising:

forming powder selected from ceramic, glass-ceramic powder and mixtures thereof into a green body;

milling the green body into a dental material; and

sintering the dental material to final density to form the restoration.

14. The method of claim 13 wherein the milled soft-sintered body retains the milled shape without the use of a mold during sintering to final density.

15. The method of claim 13 wherein the powder comprises a material that may be sintered to a strength of greater than about 250 MPa.

16. The method of claim 13 wherein the powder comprises aluminum oxide, partially stabilized zirconium oxide, mullite, or mixtures thereof.

17. The method of claim 13 wherein the green body is formed by a method selected from pressing, extrusion, slip casting, gel casting and injection molding.

18. The method of claim 17 wherein pressing comprises cold isostatic pressing, hot isostatic pressing or uniaxial pressing.

19. The method of claim 14 wherein the green body comprises powder and one or more binders.

20. The method of claim 19 wherein the powder is of uniform particle size.

21. The method of claim 20 wherein the particle size is in the range between about 1 and about 30 microns.

22. The method of claim 13 wherein the dental material is an orthodontic appliance, bridge, space maintainer, tooth replacement appliance, splint, crown, partial crown, denture, post, tooth, jacket, inlay, onlay, facing, veneer, facet, implant, abutment, cylinder, or connector.

23. The method of claim 13 wherein the green body is substantially homogeneous.

24. The method of claim 13 wherein the dental material shrinks isotropically during sintering.

25. The method of claim 13 wherein the dental material is sintered in the range of about 1600 to about 1700°C for a time ranging from about one to about four hours.

26. The method of claim 1 wherein the dental material is sintered in the range of about 1600 to about 1700°C for a time ranging from about one to about four hours.

27. A method of manufacturing a dental restoration comprising:

fabricating a die for the dental restoration, wherein the die is oversized;

applying powder selected from ceramic, glass ceramic powder and mixtures thereof onto the die in the shape of the dental restoration;

sintering the powder to form the dental restoration.

28. The method of claim 27 wherein the die is partially sintered prior to application of the powder thereon.

29. The method of claim 27 wherein the die is oversized in an amount to account for proper shrinkage of the powder after sintering.

30. The method of claim 27 wherein fabricating the die comprises machining the die from a block of material.

31. The method of claim 30 wherein the machined die is machined from data taken from a patient's mouth.

32. The method of claim 30 wherein the machined die is machined from data taken from an impression of a patient's mouth.

33. The method of claim 27 wherein the die is removed from the shaped powder prior to sintering.

34. The method of claim 1 wherein the dental material is sintered in the range of about

1400 to about 1500°C for a time ranging from about one to about four hours.

35. The method of claim 27 wherein the ceramic powder linearly shrinks isotropically about 8 to about 25% during sintering.

36. The method of claim 27 wherein the powder comprises a material that may be sintered to a strength of greater than about 250 MPa.

37. The method of claim 27 wherein the powder comprises aluminum oxide, partially stabilized zirconium oxide, mullite, or mixtures thereof.

38. The method of claim 27 wherein the die is fabricated of a porous material.

39. The method of claim 38 wherein the porous material comprises gypsum.

40. The method of claim 27 wherein applying the powder comprises pressing, extrusion, slip casting, gel casting or injection molding.

41. The method of claim 27 wherein one or more binders is mixed with the powder prior to application to the die.

42. The method of claim 27 wherein the powder is of uniform particle size.

43. The method of claim 42 wherein the particle size is in the range between about 1 and about 30 microns.

44. The method of claim 27 wherein the dental restoration is an orthodontic appliance, bridge, space maintainer, tooth replacement appliance, splint, crown, partial crown,

denture, post, tooth, jacket, inlay, onlay, facing, veneer, facet, implant, abutment, cylinder, or connector.

45. The method of claim 27 wherein the powder is substantially homogeneous.

46. The method of claim 40 wherein the dental restoration is pressed at 50,000 psi at about ambient temperature.

47. A dental restoration formed by the method of claim 1.

48. A dental restoration formed by the method of claim13.

49. A dental restoration formed by the method of claim 27.

50. Green blocks for use in the manufacture of dental restorations comprising powder selected from ceramic, glass-ceramic powder and mixtures thereof, and one or more binders, wherein the blocks have a bisque density of from about fifty percent to about seventy five percent of the theoretical density of the powder.

51. The green blocks of claim 50 having a linear shrinkage of from about eight percent to about twenty five percent of a final length of the dental restoration.

52. Soft sintered blocks for use in the manufacture of dental restorations comprising powder selected from ceramic, glass-ceramic powder and mixtures thereof, and one or more binders, wherein the blocks have a bisque density less than about eighty five percent of the theoretical density of the powder.

53. Soft sintered blocks for use in the manufacture of dental restorations comprising

powder selected from ceramic, glass-ceramic powder and mixtures thereof, and one or more binders, wherein the blocks have a bisque density less than about seventy five percent of the theoretical density of the powder.

54. The soft-sintered blocks of claim 52 having a linear shrinkage of from about six percent to about twenty two percent of a final length of the dental restoration.

55. A die for use in the manufacture of a dental restoration comprising an oversized shape.

56. The die of claim 51 wherein the shape is oversized in an amount of about 8 to about 25% of the final size of the dental restoration.

57. The method of claim 13 wherein the dental material is sintered in the range of about 1400 to about 1500°C for a time ranging from about one to about four hours.